

REMARKS

Claims 1-5 are pending in this application. Claims 1 and 5 are independent claims. Claim 6 has been canceled, the subject matter of which has been incorporated into claim 1.

In view of the above Amendment, Applicant believes the pending application is in condition for allowance.

Entry of this Amendment is Proper

Claim 1 has been amended to incorporate subject matter of canceled claim 6, with clarification of the beginning point of the claimed period of time. Claim 5 has been amended in a similar manner. Subsequently, entry of the claim amendments is proper at least because the claims are in better form for appeal.

§ 103(a) Rejection – Yamada

Claims 1-6 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Patent 6,001,203 (Yamada). Applicant respectfully traverses this rejection.

The claims are directed to a method of manufacturing a liquid crystal display panel that includes forming a liquid crystal by a “dropping method.” The manufacturing method is one in which a liquid crystal is dropped on a surface of a substrate having a seal pattern formed thereon and, thereafter, two substrates are bonded together under a vacuum to concurrently perform bonding of the substrates and filling with the liquid crystal. More specifically, a sealant is applied on one of two substrates to be bonded together in a vacuum state, a liquid crystal is dropped on one of the substrates, and the two substrates are bonded together. (Specification at page 2)

The present invention solves problems that the applicants found to occur in using this “dropping method” to manufacture small display devices. Applicant has found that the thickness of the liquid crystal may become uneven, and the liquid crystal may not spread over the whole inner surface of a seal and a gap (referred to as “vacuum bubble”) may be left. (Specification at page 3)

Applicant's solution to this problem, as recited in claim 1, is

"wherein said setting step is delayed a period of time until after said liquid crystal sandwiched between said two substrates is spread to contact said sealant along substantially a whole periphery of said sealant while both of said two substrates contact said sealant along the whole periphery of said sealant."

With regard to the claimed "delayed" period of time, the Examiner states that "the setting step is delayed for a period of time until after the attaching via spacer means in a reduced atmosphere," and refers to column 3, lines 23-38 (Office Action at page 3, paragraph above "As to claim 3"). The section at column 3 discloses two curing/setting steps of "irradiating ultraviolet rays" and "heating the seal portion" occurring after the step of "attaching the substrates."

Furthermore, Yamada at column 19 discloses a "dropping method." In particular, Yamada at column 19 discloses that, "then the substrates 12A and 12B were attached to each other in a reduced pressure of 0.4 to 1.0 Torr in the vacuum chamber 6. By further applying compression to the substrate by atmospheric pressure, the gap was controlled." (col. 19, lines 19-23)

Subsequently, Yamada discloses that the steps of "irradiating ultraviolet rays" and "heating the seal portion" occur after attaching the substrates at reduced pressure in the vacuum chamber 6. Thus, the Examiner's statement at page 3 of the Office Action appears to imply that the setting/curing step would be delayed over the period of time at which the substrates are at reduced pressure in the vacuum.

To the contrary, according to the present specification with respect to Figs. 4(a) and 4(b), "a lapse of 40-50 seconds from opening of the vacuum chamber to the atmosphere after bonding was required to attain the state shown in Fig. 4 (a), (b)," and "the step of setting the sealant was started after a lapse of 90 seconds from opening of the vacuum chamber to the atmosphere after bonding of the substrates."

In other words, a solution provided by the present invention is to delay the start of the setting step over a period beginning from opening of the vacuum chamber to the atmosphere, which is after bonding of the substrates.

Thus, Applicant has amended claim 1 to incorporate the subject matter of claim 6 and to clarify that the delay of at least 90 seconds is from first exposing the substrates to atmosphere.

In addition, claim 5 has been amended in a similar manner by indicating that the sealing step occurs after the bonding step.

Applicant submits that Yamada fails to teach or suggest at least the claimed setting step started after a delay of at least 90 seconds upon exposing the substrates to atmosphere of claim 1, the claimed setting step occurring a period of time after the bonding step and until said liquid crystal is spread to contact said sealant along substantially a whole periphery of said sealant of claim 5.

For at least these reasons, Applicant requests that the rejection be reconsidered and withdrawn.

Conclusion

In view of the above remarks, it is believed that claims are allowable.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact **Robert Downs** Reg. No. 48,222 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

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